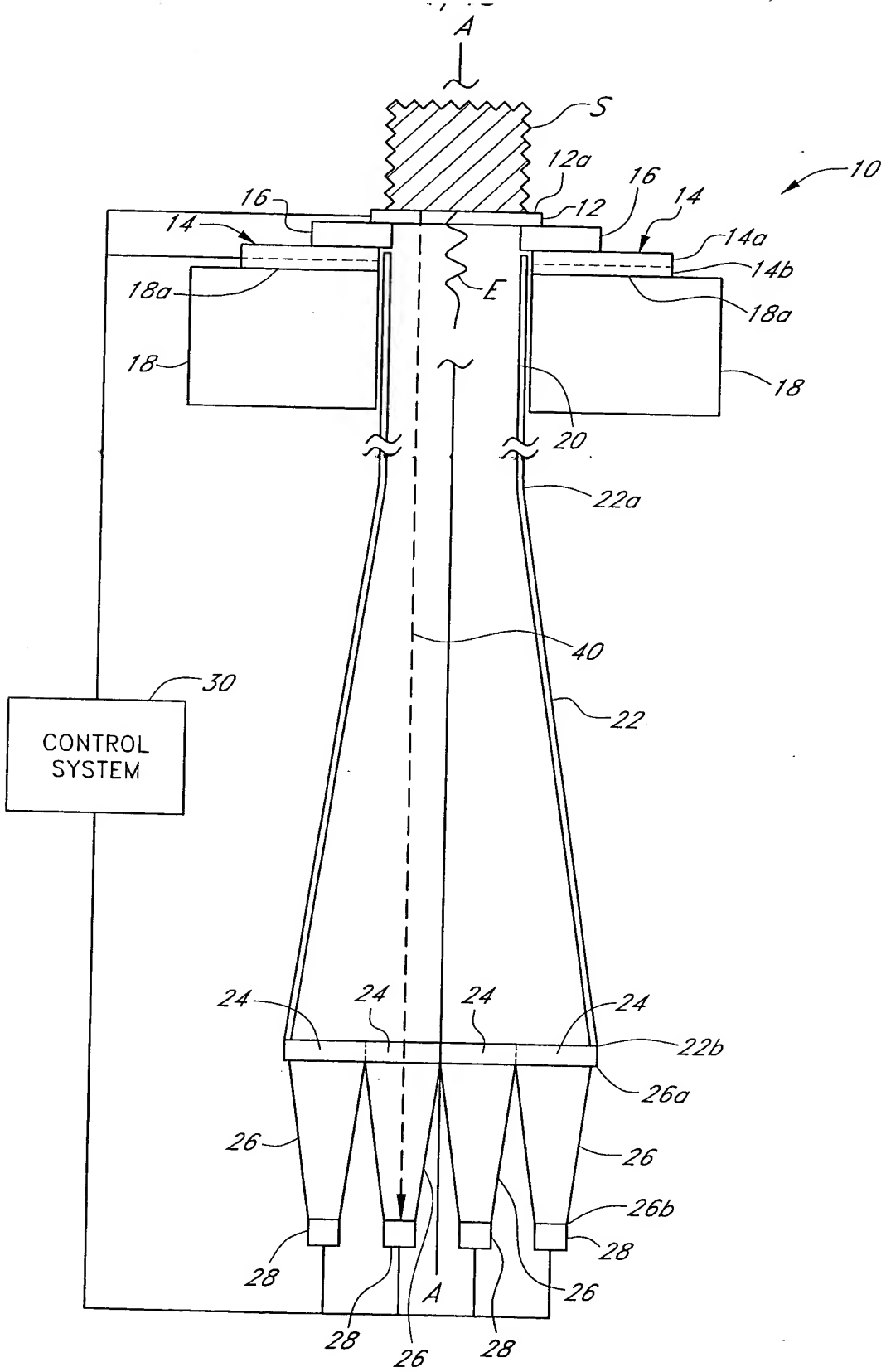
A
S
12a
16
10
16
12
14
14
14a
14b
18a
E
18a
18
18
20
22a
40
30
CONTROL SYSTEM
22
24
24
24
24
22b
26a
26
26
26b
28
28
A
28
26
28

FIG. 1

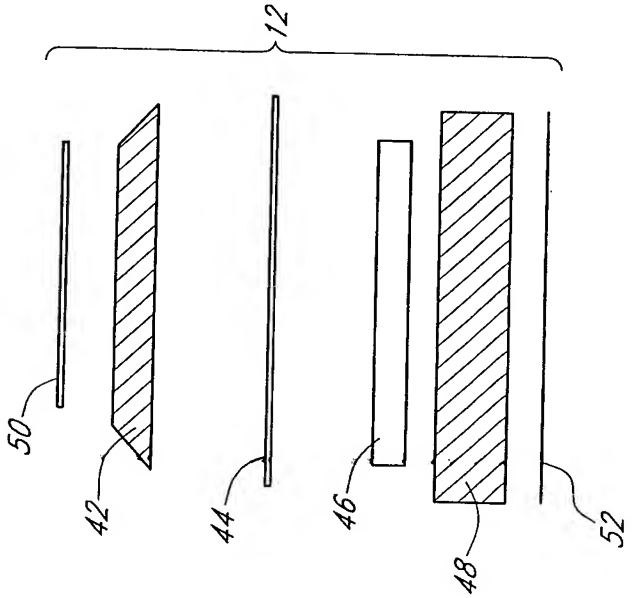


FIG. 3

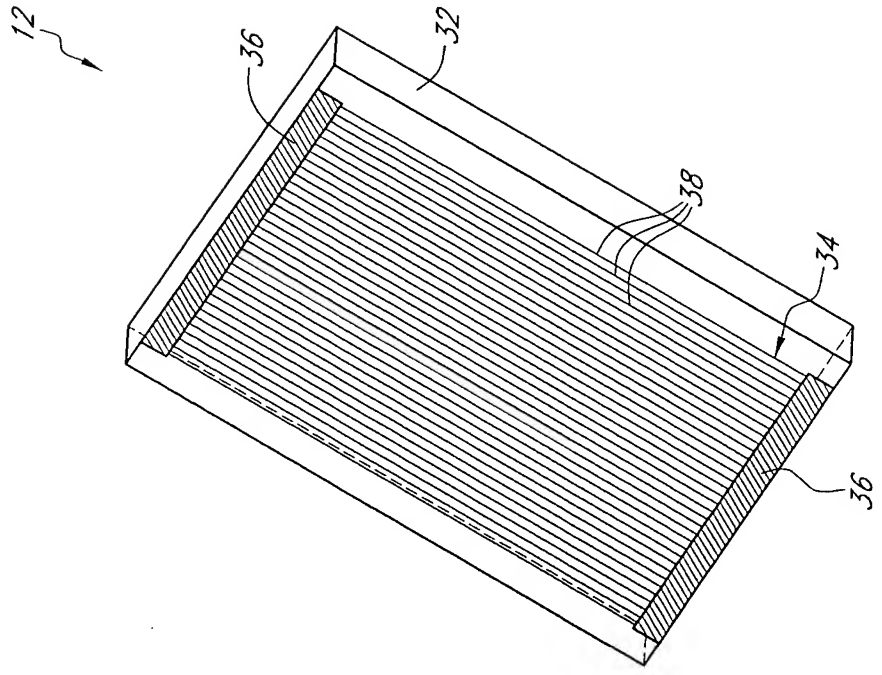


FIG. 2

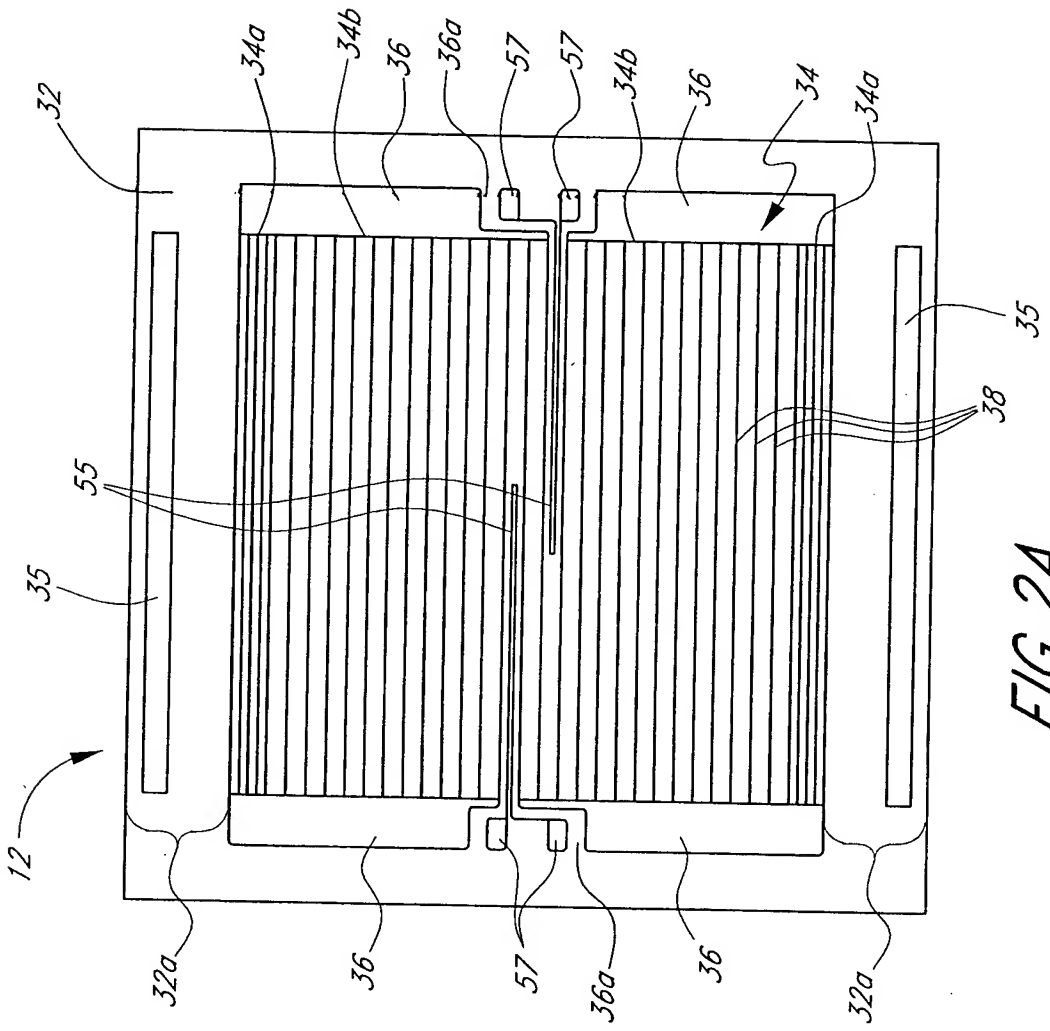
32
34a
34b
36
36a
57
57
34b
36
34
34a
35
38
55
35
12
32a
36
57
36a
36
32a

FIG. 2A

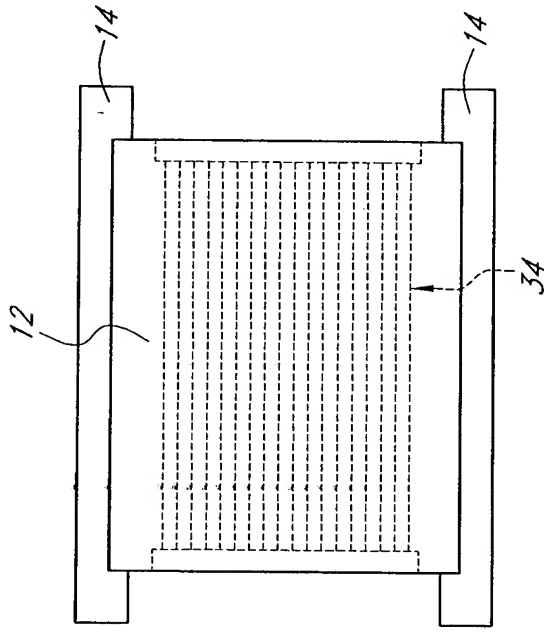


FIG. 5

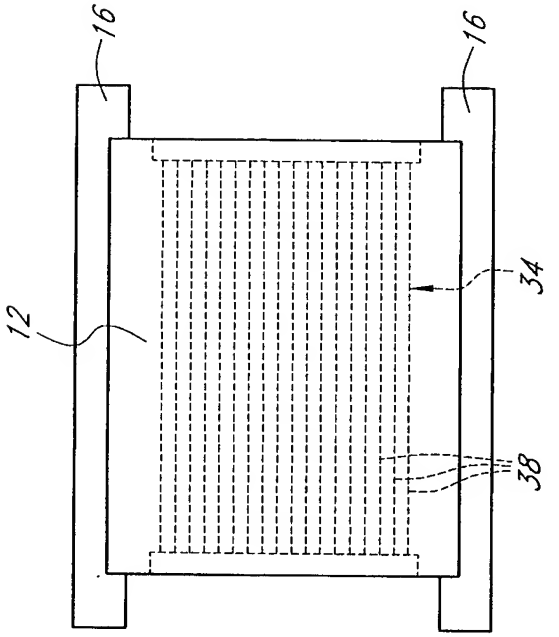


FIG. 4

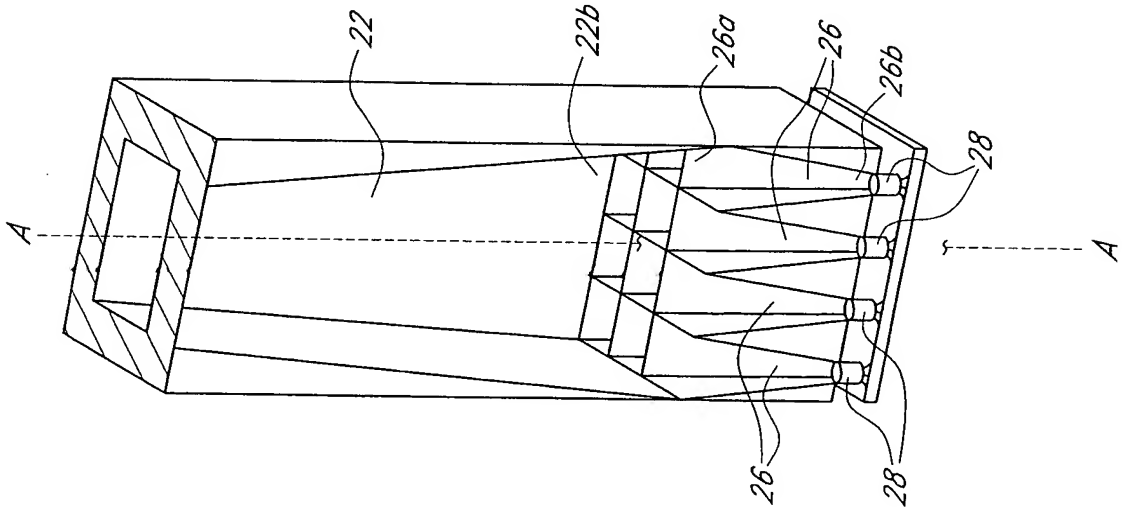


FIG. 6A

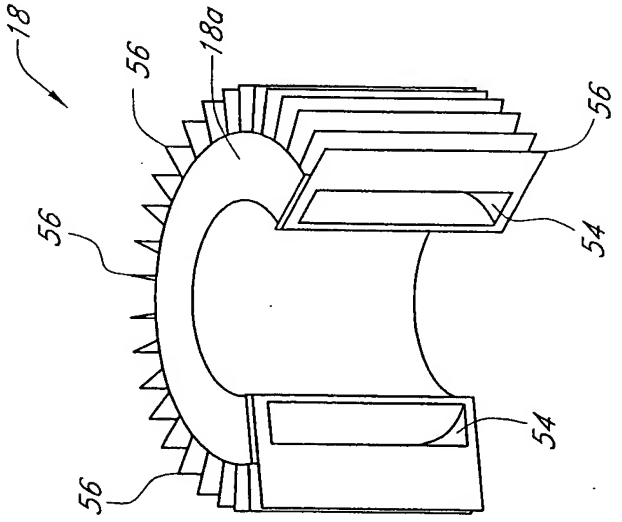


FIG. 6

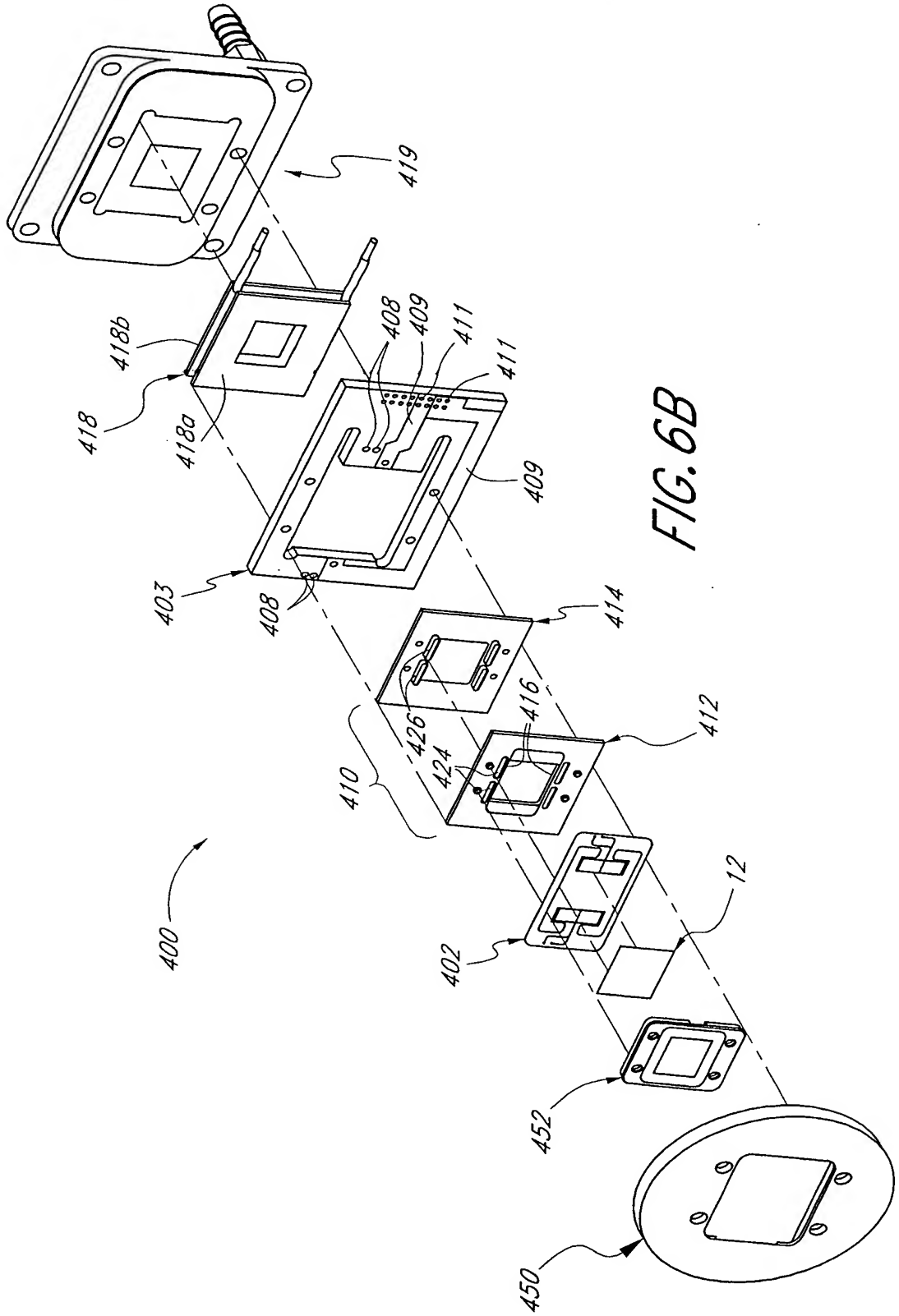
419
418b
418
418a
408
409
411
411
409
403
408
414
426
416
412
424
410
400
402
12
452
450

FIG. 6B

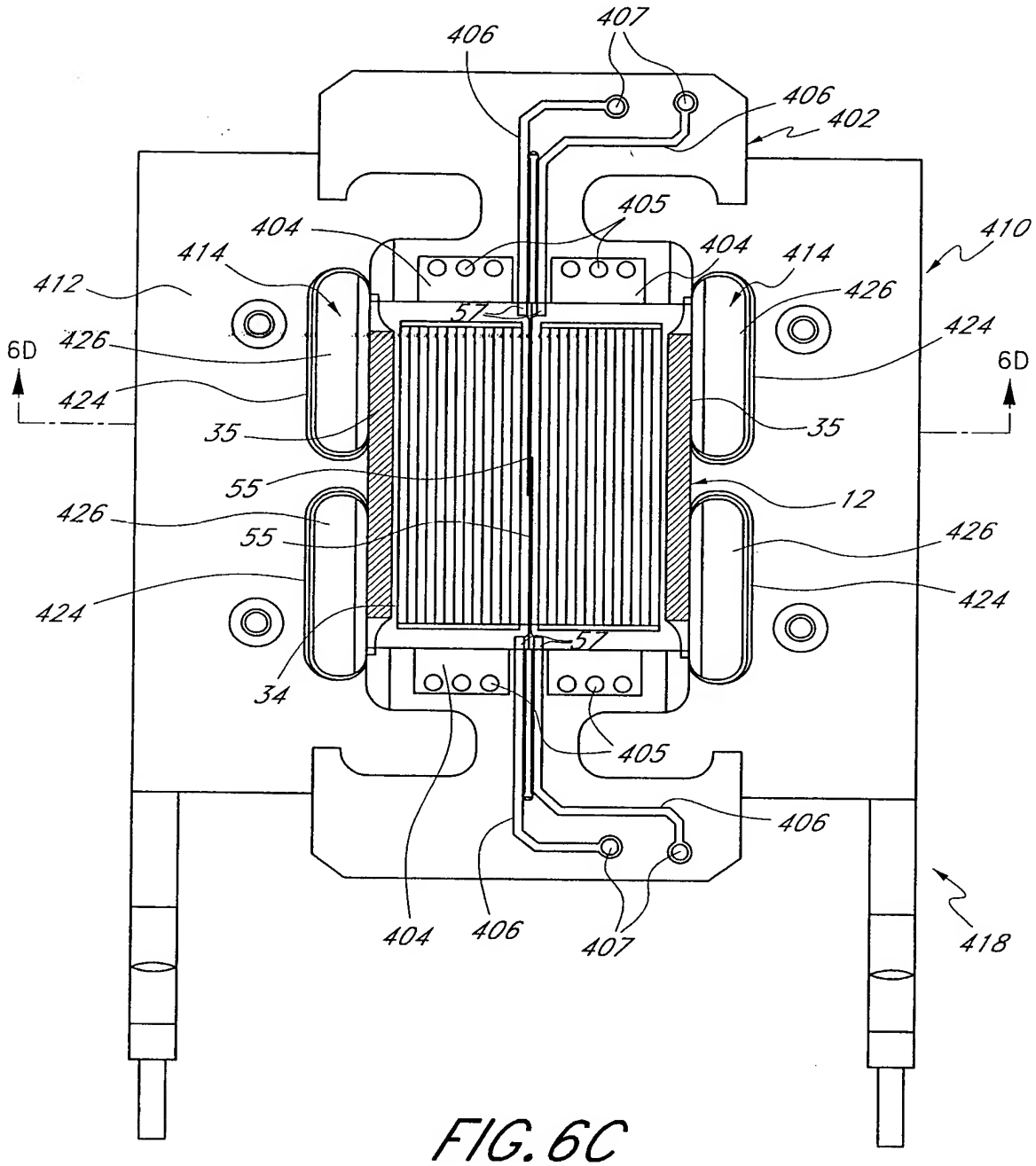
406
407
406
402
405
404
414
404
414
410
412
426
57
426
424
6D
6D
424
35
35
55
12
426
55
426
424
424
57
34
405
406
404
406
407
418

FIG. 6C

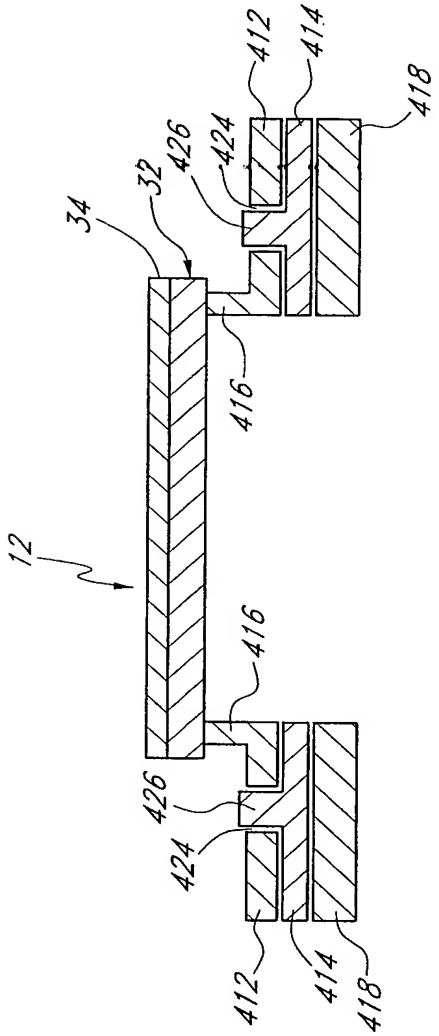


FIG. 6D

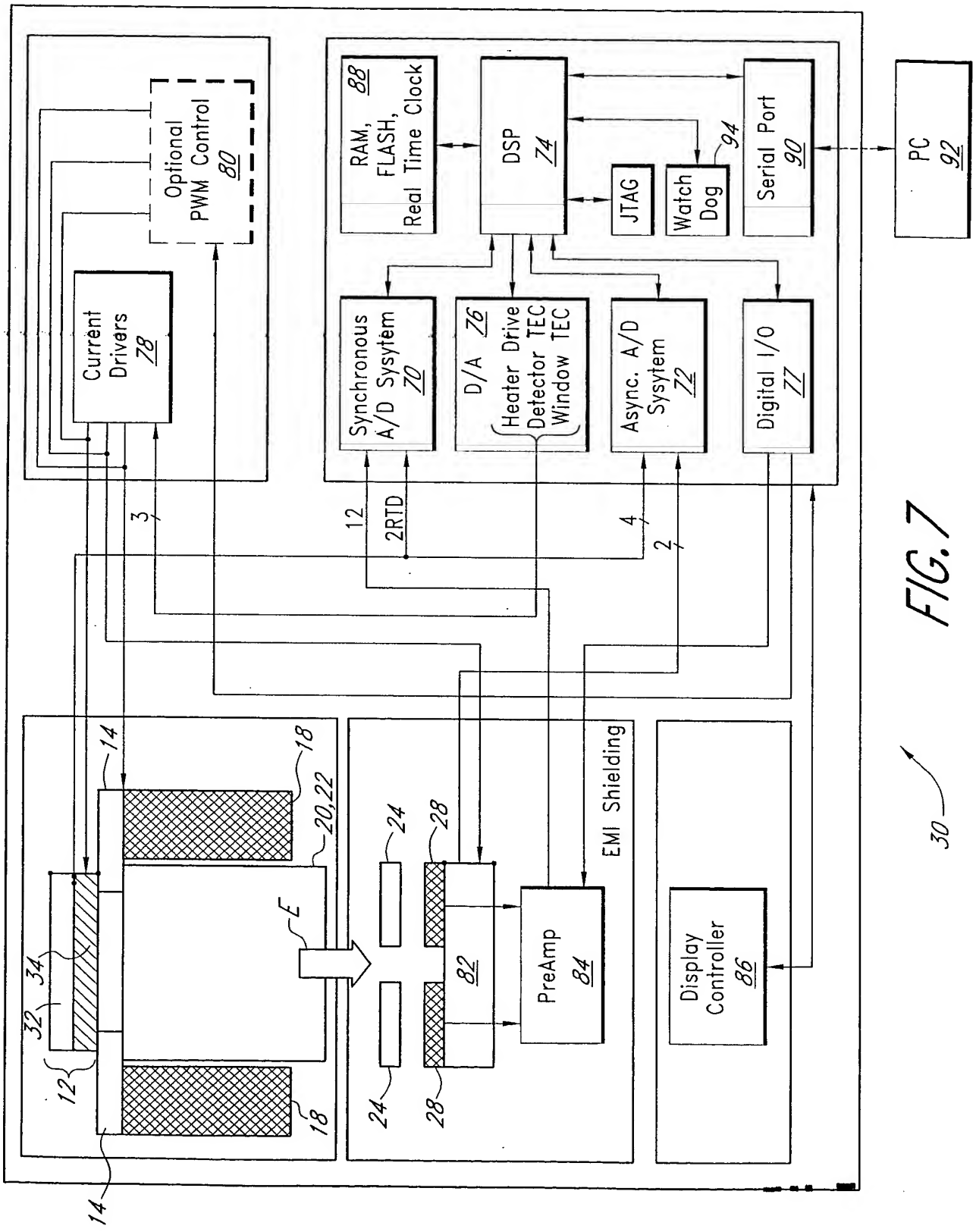
Optional PWM Control 80
Current Drivers 78
RAM, FLASH, Real Time Clock 88
DSP 74
JTAG
Watch Dog 94
Serial Port 90
PC 92
Synchronous A/D Sysytem 70
D/A 76
Heater Drive
Detector TEC
Window TEC
Async. A/D Sysytem 72
Digital I/O 77
3
12
2RTD
4
2
EMI Shielding
PreAmp 84
82
Display Controller 86
14
18
20,22
24
28
E
32
34
12
30

FIG. 7

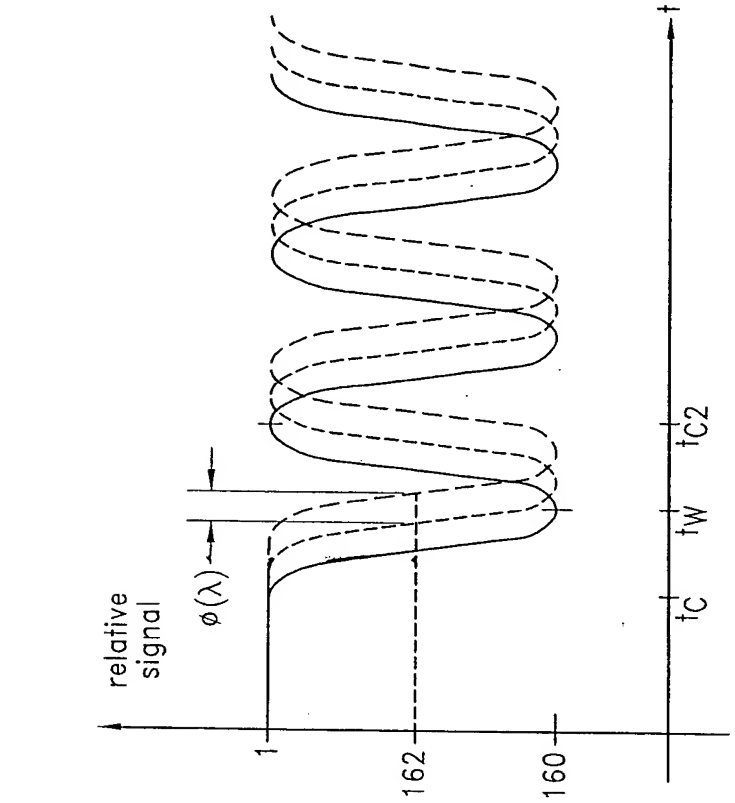
relative signal
$\phi(\lambda)$
1
162
160
$t_C$
$t_W$
$t_{C2}$
t
J ——— surface tissue reference signal
K ------- analytical signal
L - - - - - deep tissue reference signal

FIG. 9

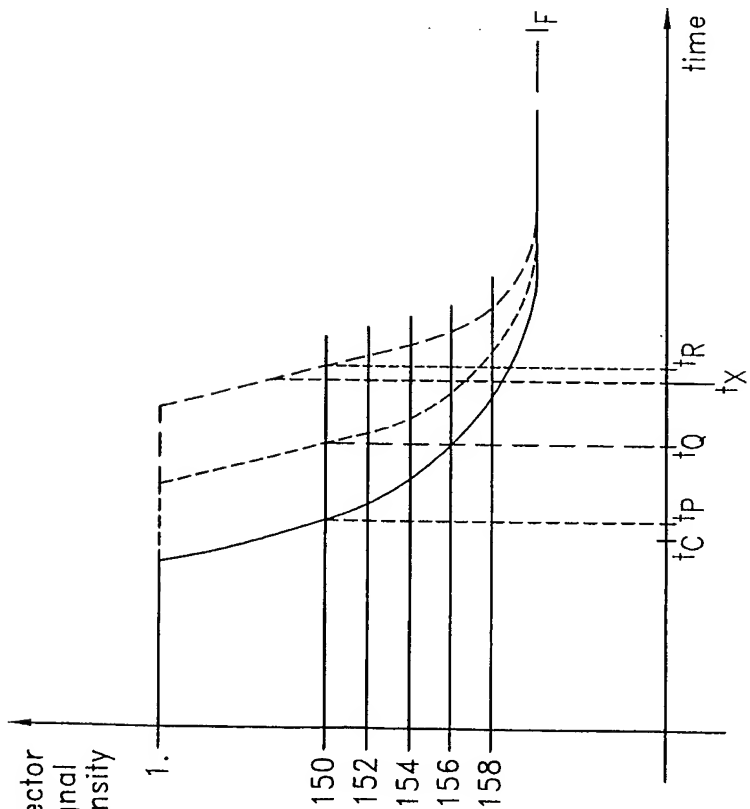
detector signal intensity
1.
150
152
154
156
158
$I_F$
time
$t_C$ $t_P$ $t_Q$ $t_R$ $t_X$
P ——— surface tissue reference λ signal
Q ------- analytical signal
R - - - - - deep tissue reference λ signal

FIG. 8

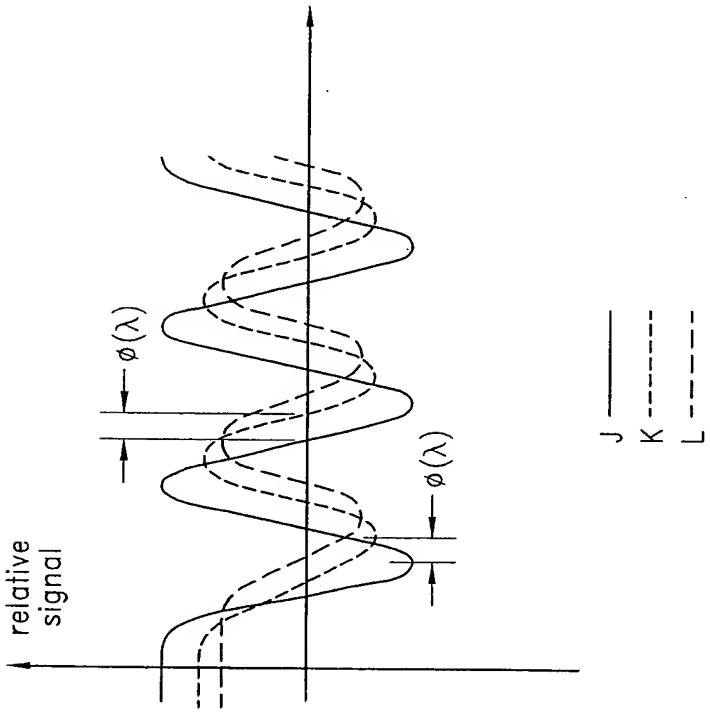


FIG. 10

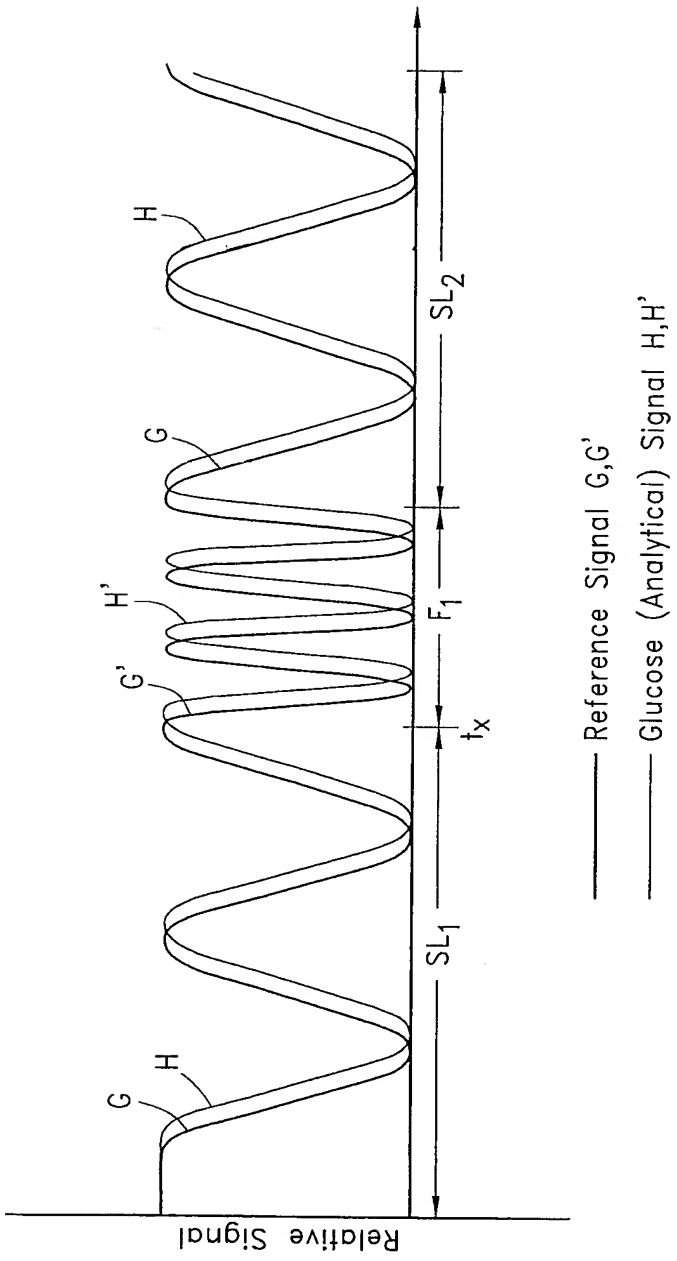
Relative Signal
G
H
G'
H'
G
H
$SL_1$
$t_x$
$F_1$
$SL_2$
Reference Signal G,G'
Glucose (Analytical) Signal H,H'

*FIG. 11*

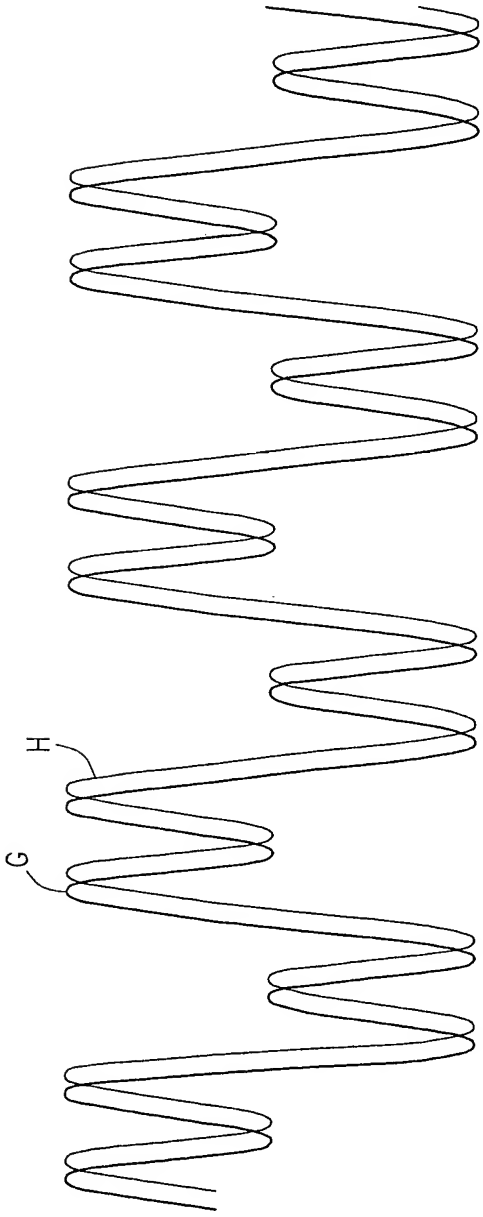


*FIG. 12*

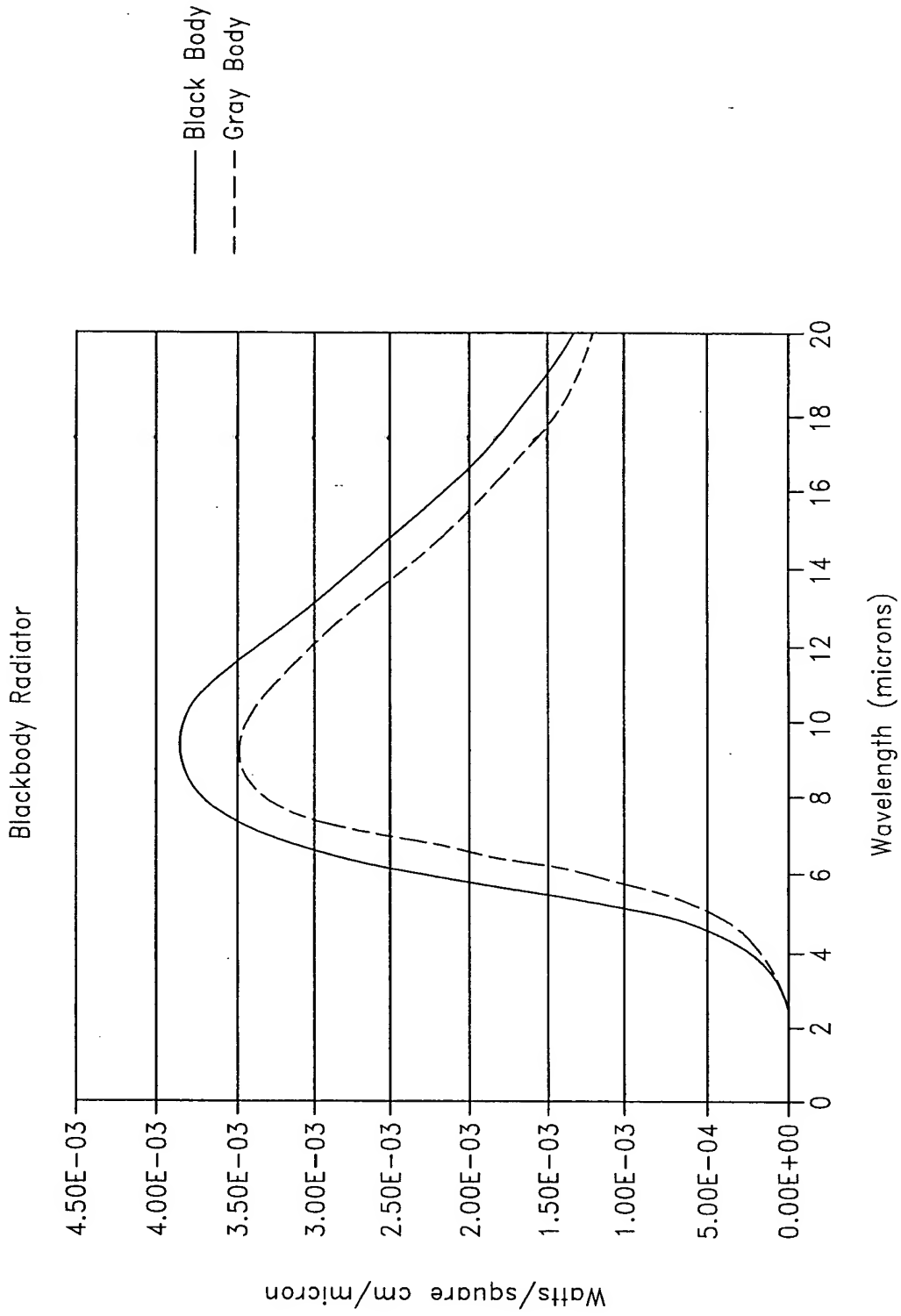
Black Body
Gray Body
Blackbody Radiator
Watts/square cm/micron
4.50E-03
4.00E-03
3.50E-03
3.00E-03
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
0
2
4
6
8
10
12
14
16
18
20
Wavelength (microns)

*FIG. 13*

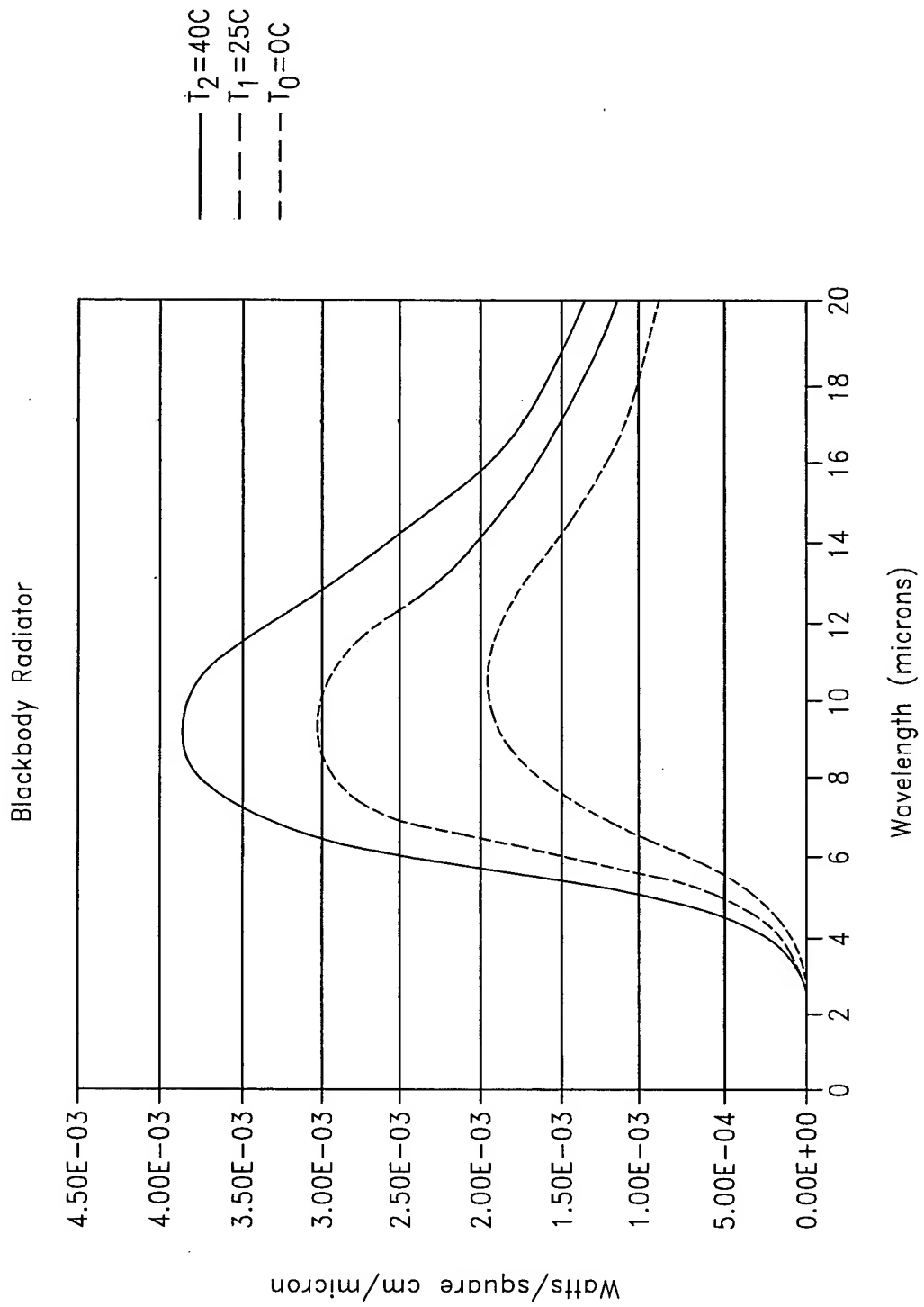
T2=40C
T1=25C
T0=0C
Blackbody Radiator
Watts/square cm/micron
4.50E-03
4.00E-03
3.50E-03
3.00E-03
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
0
2
4
6
8
10
12
14
16
18
20
Wavelength (microns)

*FIG. 14*

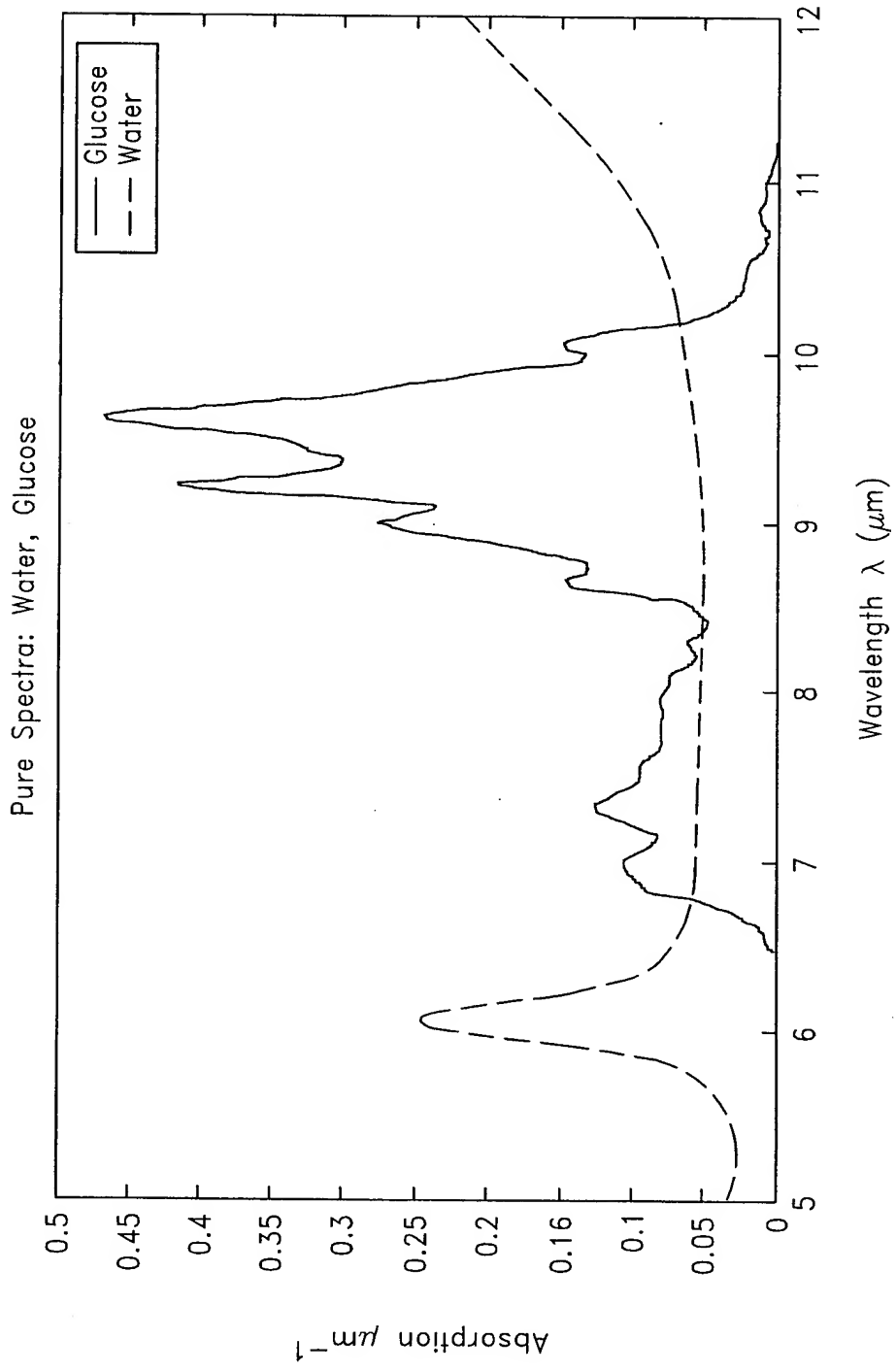
Pure Spectra: Water, Glucose
Glucose
Water
Absorption $\mu m^{-1}$
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.16
0.1
0.05
0
5
6
7
8
9
10
11
12
Wavelength λ (μm)

FIG. 15

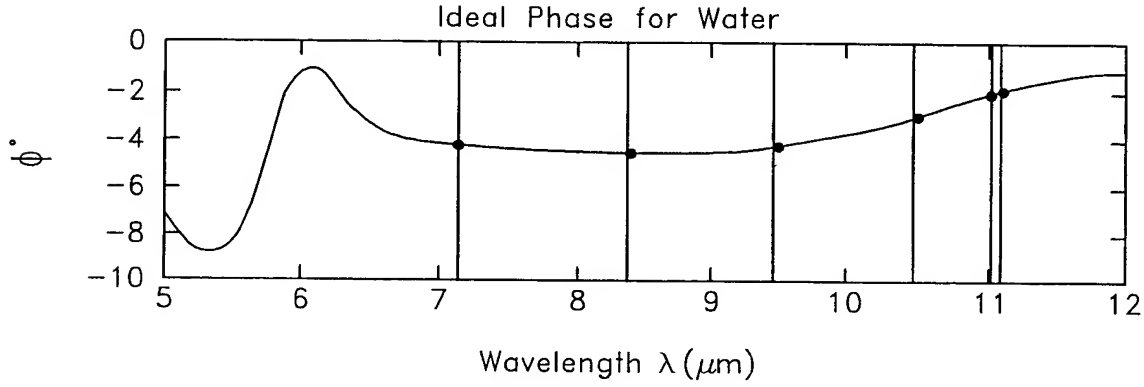
Ideal Phase for Water
0
−2
−4
−6
−8
−10
φ
5
6
7
8
9
10
11
12
Wavelength λ (μm)

*FIG. 16*

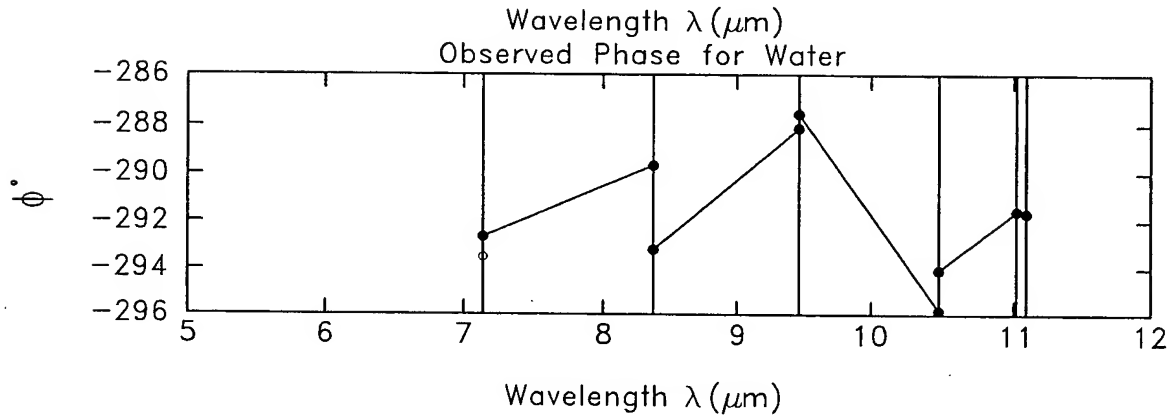
Wavelength λ (μm)
Observed Phase for Water
−286
−288
−290
−292
−294
−296
φ
5
6
7
8
9
10
11
12
Wavelength λ (μm)

*FIG. 17*

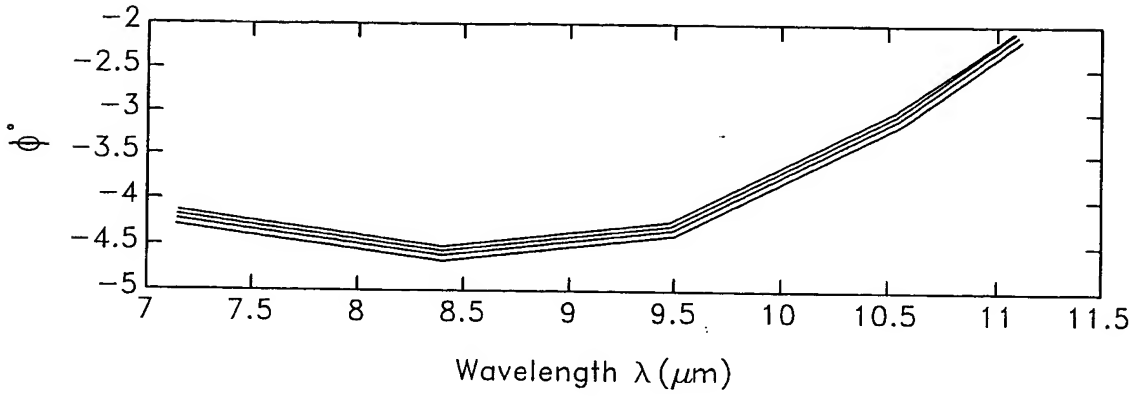


FIG. 18

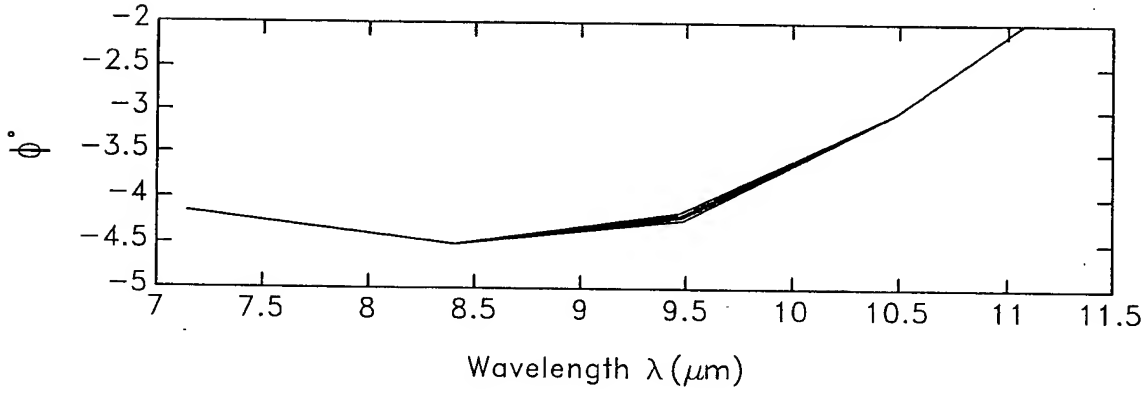


FIG. 19

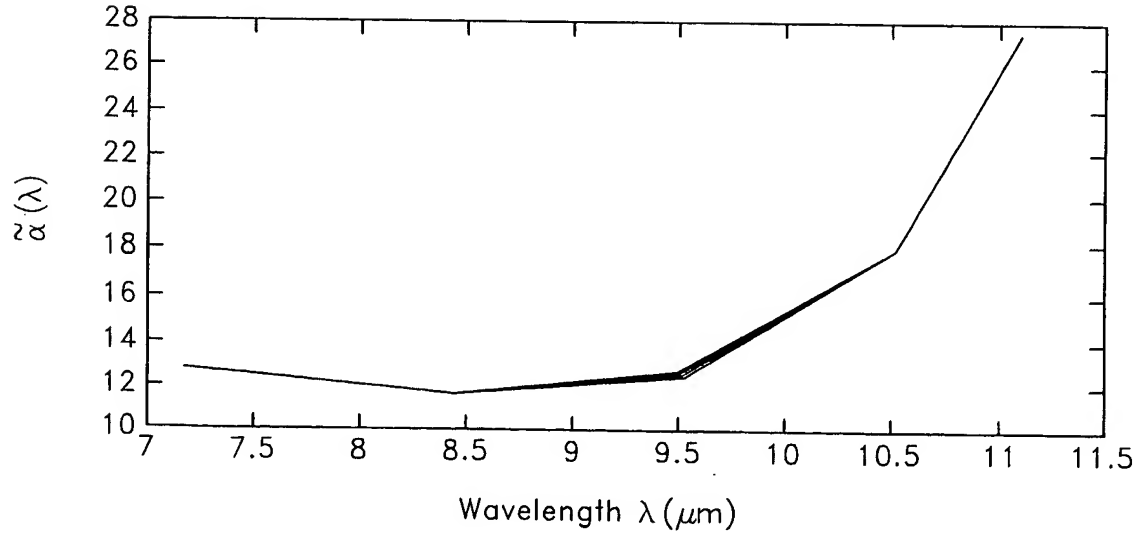


FIG. 20